FUTURE FISHERIES IMPROVEMENT PROGRAM
GRANT APPLICATION
(please fill in the highlighted areas)

I. APPLICANT INFORMATION

A. Applicant Name: Jim Olsen

B. Mailing Address: 1820 Meadowlark Lane

C. City: Butte State: MT Zip: 59701

Telephone: 533-8451

D. Contact Person: Same as above

Address if different from Applicant:

City: State: Zip:

Telephone:

E. Landowner and/or Lessee Name (if other than Applicant): John Sampson

Mailing Address: 2487 Hwy 287

City: Sheridan State: Mt Zip: 59749

Telephone: 406-596-1305

II. PROJECT INFORMATION*

A. Project Name: Smith Slough Spawning Enhancements

River, stream, or lake: Smith Slough

Location: Township 4S Range 6W Section 6

Latitude: 45.524772 Longitude: 112.386936 *within project (decimal degrees)*

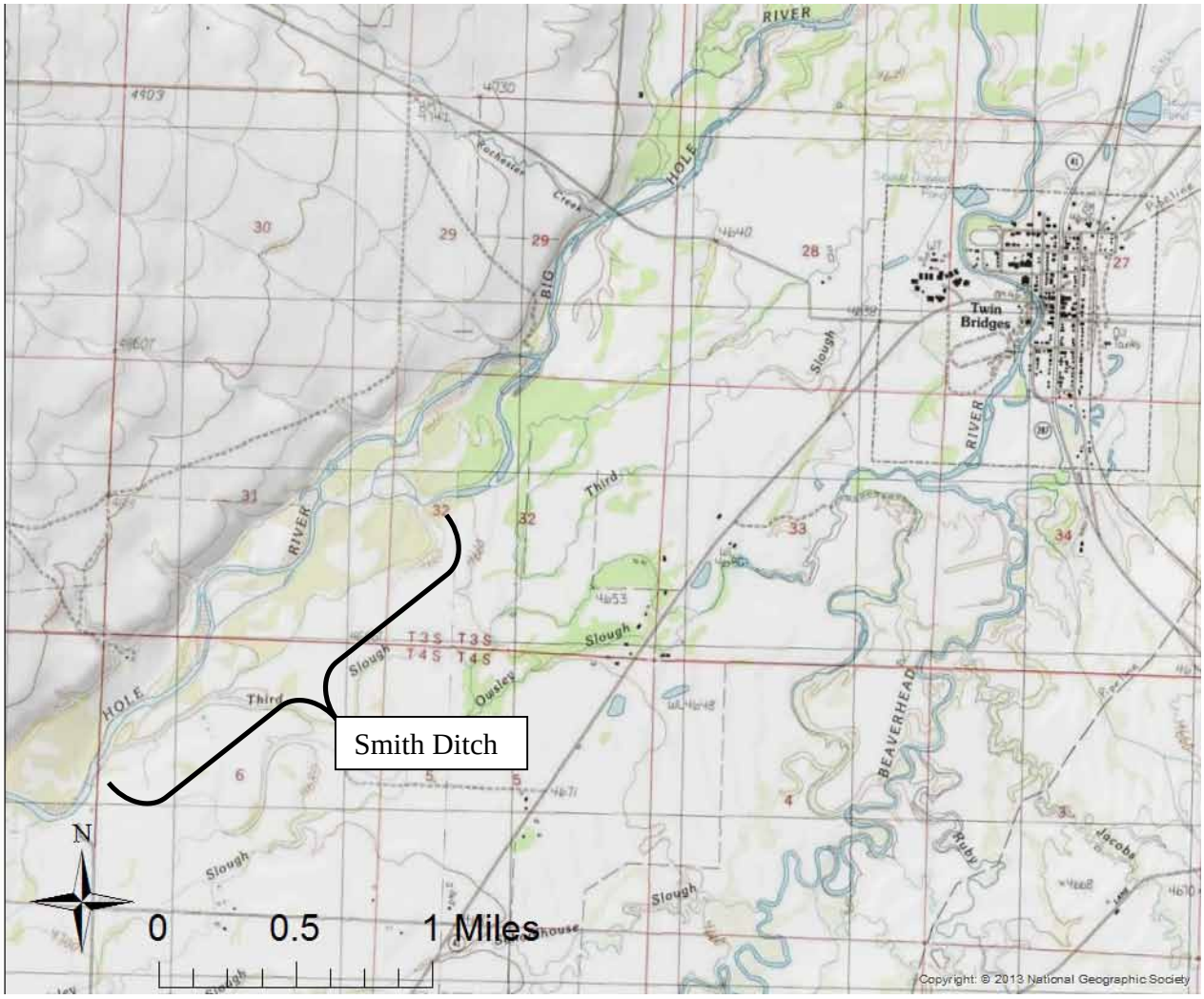
County: Madison

B. Purpose of Project:

Enhance existing slough to provide spawning and rearing habitat, reduces summer temperature and improve adult habitat.

C. Brief Project Description

The project reach is approximately 3.5 miles southwest of Twin Bridges, Montana, and includes a 2-mile long slough channel of the Big Hole River called the Smith Slough and a 1-mile segment of the Smith Ditch. The purpose of the Smith Slough Fisheries Enhancement Project is to improve wild brown and rainbow trout spawning, improve habitat adult fish, improve water quality by reducing temperature and improve water quantity through changes in irrigation practices in the slough. This would be done by replacing the existing diversion and headgate structure, narrowing and deepening over widened sections of the slough channel, adding spawning gravel to areas that have suitable velocity and depth for spawning, rerouting irrigation return flows away from the slough system and converting from flood irrigation to a pivot system. This will result in improved habitat for fish and improved water quality and quantity returning to the Big Hole River. The slough and ditch system originate from the Big Hole and parallel the river for approximately 2 miles before discharging directly back to the river.



Revised August 14, 2014

Spawning Habitat. The lower 22 miles of the Big Hole River lacks any tributary streams that naturally flow to their confluence with the river and could provide spawning habitat. Further, frequent bank stabilization projects completed in the lower reaches of the river have resulted in less braiding and side channel development than in reaches of river upstream that do contain spawning habitat. FWP has identified the fishery in the lower river as limited in part by available spawning habitat (Big Hole River Fisheries Management Plan, 1988). The enhancements planned in the slough channel will add approximately 1,600 ft of high quality spawning areas that will be self-maintaining through time. The Smith Ditch/ Slough Channel splits into two separate systems approximately 1,500 ft downstream of the headgate. The Slough Channel and the Smith Ditch parallel each other for over a mile before rejoining and flowing back to the Big Hole River. The Smith Ditch portion of the channel (eastern channel) will be used as the spawning channel because this channel is not affected by periodic high river flows. When the Big Hole over tops its banks a portion of the river flows end up in the slough channel which would potentially scour away imported smaller gravels. The Smith Ditch, on the other hand, is not affected by high river flows making it the better candidate for spawning enhancements. While the Smith Ditch is technically a ditch, it flows through a historic braid of the Big Hole River and therefore has characteristics of a stream channel rather than a ditch. The channel meanders back and forth with typical riffle pool sequences. However, there is very little spawning habitat present in the Smith Ditch channel because it was formed by the Big Hole River whose substrate is primarily softball sized and larger cobble which is too large for trout spawning. Trout select spawning gravels that are typically 1.5-2.0 inches in diameter to construct redds. We plan on constructing 1,600 ft of spawning areas in the Smith Ditch channel. This habitat would be constructed by excavating existing sediments in areas that have appropriate depth and velocity and replacing the excavated sediment with appropriately sized spawning substrate. These spawning areas have been identified in the attached design. Adult fish habitat would not be emphasized in the ditch channel to reduce the potential for increased brown trout predation on juvenile fish. Pools will be relatively shallow and will contain juvenile habitat such as partially submerged brush piles. It is anticipated that the flows in the Ditch channel and slough channel will be approximately 7-8 cfs. A water management plan will be developed to determine flushing flow rates that can be diverted down both channels to mobilize fine sediments but not displace spawning sized gravels. FWP will collect and fertilized eggs from trout in the Big Hole River and incubate the eggs in the spawning channel to jump start the fishery. By doing this it is expected that the juvenile trout produced will migrate to the river to grow and once they reach maturity they will return to the channel to spawn.

Adult Fisheries. The other significant factor affecting the fishery in the lower Big Hole River is water quantity, particularly in drought years. Low flows in the river result in loss of aquatic habitat and high water temperatures. Restricted and poor quality habitat may cause fish to seek other habitats where conditions are better. It is hoped that improving adult fish habitat in the Smith Slough will provide a local refuge for adult fish when conditions in the river are suboptimal. In order to improve adult trout habitat in the Smith Slough system over-widened sections of the stream will be narrowed and deepened. Approximately 4,300 ft of stream channel have been identified as being over-widened in the slough. To narrow the channel gravels would be excavated from the exiting stream bed and placed on the banks. Riffle pool

sequences will be established according to the engineer's specifications. Native sod mats harvested from nearby sources would be placed on the gravel to form a natural bank. Willow cuttings or mature willow transplants would also be placed on the newly formed bank. This technique creates nearly instant bank stability and cover for fish. The deeper narrower habitat will greatly enhance adult fish habitat. It will also have a secondary effect of buffering high water temperatures. A wide and shallow channel is exposed to increased solar radiation and convectional heat transfer. This results in warmer water temperatures during warm summer months. Restoring an appropriate width to depth ratio in the channel and planting riparian vegetation will provide shade and will aid in reducing thermal loading to the stream.

Water Quality. The objectives to improve water quality include the rerouting of irrigation return water to prevent its discharge to the slough system and eventually the Big Hole River. A significant amount of irrigation return water from flood irrigated fields upstream of the propose project area enter the Slough within 1,000 ft of the headgate. These warm and nutrient rich waters contribute thermal and nutrient loading to the slough system and eventually the Big Hole River. This project aims at rerouting these return flows around the slough and into an adjacent swale that will take the water away from the slough and ditch system. Rerouting this return water will also require a minor reroute of the Smith Ditch (See Alternative 2 in attached design). Preventing these waters from entering the Smith Ditch and eventually the Big Hole River will reduce one substantial point source of thermal pollution to the slough and river.

Prior to returning to the Big Hole River the Smith Slough channel enters a wide and shallow oxbow bend of the river. Flows are backed up in this oxbow from the river and channel is wide and lacking significant water movement. Any thermal benefits of the slough channel narrowing upstream could be potentially lost before the water is discharged to the river. To mitigate this concern, the lower 700 feet of the slough channel will be relocated through a swale further west and a new channel will be constructed to deliver flows at base flows directly to the Big Hole River rather than through the existing wide and shallow oxbow.

Relocating the headgate structure from its current location on a maintained side channel of the Big Hole River to bank of the river itself would also result in improved water quality in the river (Alternative1b in attached design). Currently frequent maintenance is required to provide water to the Smith Ditch headgate. This maintenance involves the excavation of river gravel to create a flowing channel of water to the headgate. Relocating the headgate to the Big Hole River would reduce the probability of future maintenance in the form of excavation of stream gravels.

Water Quantity. To improve water quantity in the slough and Big Hole River, the new landowners of the property the Smith Ditch services are currently converting from flood irrigation practices to a single pivot sprinkler system. The conversion of flood to sprinkler irrigation is expected to reduce irrigation demand from the Smith Ditch system from 15 cfs to 3 cfs, allowing for up to 12 cfs of water to remain in the Slough Channel and/or the Smith Ditch channels and eventually return directly to the Big Hole River. The location of the center pivot and pump is in the lower 1/3 of the slough channel and, therefore, the majority of the water savings will remain in the slough system through the end of the project. The pump for the

sprinkler irrigation will draw water directly from the slough channel and will eliminate the need for more than 4,000 ft of conveyance ditch. This work was completed in the fall of 2014 and the lateral flood irrigation ditches were obliterated in the spring of 2015. These activities were funded solely by the private landowner and the associated costs of this conversion are not included in the project budget.

A preliminary design has been completed for the fisheries and water quality enhancement work by Confluence Consulting Inc (see attached). The funds requested from the Future Fisheries Improvement program are primarily for the construction of the spawning channel in the Smith Ditch and the replacement of the headgate structure. This project stands to have a potentially significant benefit to the Big Hole River and its fishery. Similar projects that enhanced spawning habitat and conserved flows on the Jefferson have had a significant positive impact on the fishery of that river and its resiliency through frequent droughts. It is anticipated that the proposed project could have similar positive impacts for the lower Big Hole River.

The initial application submitted to FFIP in Dec 2014 had included significant match sources from DNRC (RRGL Program) and DEQ (319). We were not successful at obtaining these funds. However, the landowner is willing to move the project forward and absorb more of the costs of the overall project. However, the scope may be adjusted to fit within his budget. This proposal includes all the proposed work. If adequate funding is not available 2 parts of the project may be excluded or delayed until funding can be obtained. The 2 parts that may not be implemented are the rerouting of irrigation return flows to the slough system ($33,715) and creating the new channel that would bypass the oxbow of the Big Hole River at the downstream end of the project area ($16,000).

D. Length of stream or size of lake that will be treated: 6,950 ft

E. Project Budget:

Grant Request (Dollars): $ $50,000

Contribution by Applicant (Dollars): $ _____ In-kind $ _____
(salaries of government employees are not considered as matching contributions)

Contribution from other Sources (Dollars): $ **$25,000** In-kind $ **$30,995**
(attach verification - See page 2 budget template)

Total Project Cost: $ $375,995

F. Attach itemized (line item) budget – see template

G. Attach specific project plans, detailed sketches, plan views, photographs, maps, evidence of landowner consent, evidence of public support, and/or other information necessary to evaluate the merits of the project. If project involves water leasing or water salvage complete supplemental questionnaire (fwp.mt.gov/habitat/futurefisheries/supplement2.doc).

H. Attach land management and maintenance plans that will ensure protection of the reclaimed area. Cattle grazing occurs currently on the ranch. The irrigated pastures are grazed in the fall and the river bottom area where the channels are located are grazed in the winter. However, going forward there will be no grazing the river bottom pasture.

III. PROJECT BENEFITS*

A. What species of fish will benefit from this project?:

Brown and rainbow trout

B. How will the project protect or enhance wild fish habitat?:

This project will enhance spawning habitat in the lower Big Hole River through the creation of 1,700 ft of spawning habitat in the Smith Ditch channel. The lower river is spawning limited which, in part, limits the number of trout in this section. Adult habitat will also be improved which will provide potential refuge for adult fish from the Big Hole River when conditions are poor due to low flows and high water temperatures. Because the slough originates from and discharges to the Big Hole River, fish will have unrestricted access to the slough to move back and forth.

C. Will the project improve fish populations and/or fishing? To what extent?:

The numbers of trout in the lower Big Hole River is approximately 1/3 those present only 20 miles upstream. Because of the lack of spawning habitat, it appears that many of the fish in the lower section of river are produced either upstream (mostly brown trout) or migrate from the Jefferson River (rainbow trout). Further, because of the low density and warmer water temperatures fish growth in the lower section of the river is much greater than farther upstream. Therefore, if more fish could be recruited to the lower river population locally it could greatly enhance the fishery in the river. Local recruitment could also buffer the large swings in population density in the lower river that occur when habitat conditions are poor (i.e., during droughts). Similar projects on the Jefferson River downstream have had dramatic effects on the fishery of that river.

D. Will the project increase public fishing opportunity for wild fish and, if so, how?:

This project will increase public fishing opportunity because the fishery could be significantly improved if there were a local source of spawning and recruitment to the river. It is possible that the fishery could double in the lower river. There are public fishing access sites and public bridges on the river both upstream and downstream of the project area that provide floater and foot access to the river.

E. If the project requires maintenance, what is your time commitment to this project?:

The only regular maintenance that is anticipated is following the flow management plan that will provide flushing flows to maintain habitat in both the spawning channel and the Smith Slough channel. The area where both channel exist will be excluded from cattle grazing. Grazing has only occurred in these pastures in the winter so there are few if any impacts to the slough channel or ditch channel from livestock grazing.

F. What was the cause of habitat degradation in the area of this project and how will the project correct the cause?:

It is unknown if there was more spawning habitat available historically in the lower Big Hole River prior to the many bank stabilization projects in the area. There are no tributaries to the lower river that naturally flow year round. The proposed work will add 1,600 ft of spawning habitat to the lower Big Hole River. This habitat will be protected from high river flows and will be self maintaining by following the flow management plan. Spawning habitat is present in Smith Slough channel and some brown trout currently use it for spawning. The cause of the low water conditions and high water temperatures in the lower Big Hole River is irrigation withdrawal. Because this is the downstream extent of the drainage and because much of the water that is diverted from the lower Big Hole River irrigates land on the Beaverhead River floodplain and therefore discharges back to the Beaverhead rather than the Big Hole, flows can be limiting. Beginning in 2013, the Big Hole Watershed Committee expanded their drought management plan to include a new section of river from Notch Bottom (River mile 19) to the confluence with the Beaverhead River. This section has specific flow targets aimed at keeping minimum flows in the river to protect aquatic habitat and reduce the impacts of high water temperature. The drought management plan asks water users to voluntarily reduce irrigation withdrawals when flow trigger points are met. Following the plan is aiding in the awareness of water users of river flows and keeping more water in the river for fish.

G. What public benefits will be realized from this project?:

The public benefits of this project are an enhanced fishery in the lower Big Hole River through increased brown and rainbow trout spawning and recruitment. Increased production of juvenile fish will lead to increased production of adult fish in the mainstem river that will be accessible to anglers. The work will also provide refuge habitat in the slough when conditions in the mainstem river become suboptimal due to low flows and higher water temperature.

H. Will the project interfere with water or property rights of adjacent landowners? (explain):

No. The headgate structure is located on an adjacent landowner's property, but there is an existing easement that will allow for the relocation of the structure and channel work on this property. The remaining work in the channel will be done within the property of the cooperating landowner.

I. Will the project result in the development of commercial recreational use on the site?: (explain):

No. There is no commercial activity on the site.

J. Is this project associated with the reclamation of past mining activity?:

Yes.

Each approved project sponsor must enter into a written agreement with the Department specifying terms and duration of the project.

IV. AUTHORIZING STATEMENT

I (we) hereby declare that the information and all statements to this application are true, complete, and accurate to the best of my (our) knowledge and that the project or activity complies with rules of the Future Fisheries Improvement Program.

Applicant Signature: _____ Date: 5-29-15

Sponsor (if applicable): _____

***Highlighted boxes will automatically expand.**

Mail To: **Montana Fish, Wildlife & Parks**
Habitat Protection Bureau
PO Box 200701
Helena, MT 59620-0701

E-mail To: **Michelle McGree**
mmcgree@mt.gov

Incomplete or late applications will be returned to applicant.
Applications may be rejected if this form is modified.

*****Applications may be submitted at anytime, but must be received by the Future Fisheries Program office in Helena before December 1 and June 1 of each year to be considered for the subsequent funding period.*****

Revised August 14, 2014

BUDGET TEMPLATE SHEET FOR FUTURE FISHERIES PROGRAM APPLICATIONS

WORK ITEMS (ITEMIZE BY CATEGORY)	NUMBER OF UNITS	UNIT DESCRIPTION*	COST/UNIT	TOTAL COST	CONTRIBUTIONS			
					FUTURE FISHERIES REQUEST	IN-KIND SERVICES**	IN-KIND CASH	TOTAL
Personnel								
Survey				$ -				$ -
Design	1		$54,000.00	$ 54,000.00			54,000.00	$ 54,000.00
Engineering				$ -				$ -
Permitting	1		$8,000.00	$ 8,000.00			8,000.00	$ 8,000.00
Oversight				$ -				$ -
Labor				$ -				$ -
			Sub-Total	$ 62,000.00	$ -	$ -	$ 62,000.00	$ 62,000.00
Travel								
Mileage				$ -				$ -
Per diem				$ -				$ -
			Sub-Total	$ -	$ -	$ -	$ -	$ -
Construction Materials								
Smith Slough Channel work	1		$83,050.00	$ 83,050.00			83,050.00	$ 83,050.00
Smith Ditch Spawning	2000	CY spawning gra	$55.00	$ 110,000.00	40,000.00		70,000.00	$ 110,000.00
Replace headgate	1		$60,750.00	$ 60,750.00	10,000.00		50,750.00	$ 60,750.00
Redirect irrigation return flows away from slough	1		$22,650.00	$ 22,650.00			22,650.00	$ 22,650.00
Oxbow bypass channel	1		$9,000.00	$ 9,000.00			9,000.00	$ 9,000.00
				$ -			-	$ -
				$ -			-	$ -
				$ -			-	$ -
				$ -			-	$ -
			Sub-Total	$ 285,450.00	$ 50,000.00	$ -	$ 235,450.00	$ 285,450.00
Equipment								
				$ -				$ -
				$ -				$ -
				$ -				$ -
				$ -				$ -
				$ -				$ -
				$ -				$ -
			Sub-Total	$ -	$ -	$ -	$ -	$ -
Mobilization								
				$ -				$ -

BUDGET TEMPLATE SHEET FOR FUTURE FISHERIES PROGRAM APPLICATIONS

				$ -				$ -
				$ -				$ -
Contingency (10%)	1		$28,545.00	$ 28,545.00			28,545.00	$ 28,545.00
			Sub-Total	$ 28,545.00	$ -	$ -	$ 28,545.00	$ 28,545.00
			TOTALS	$ 375,995.00	$ 50,000.00	$ -	$ 325,995.00	$ 375,995.00

*Units = feet, hours, inches, lump sum, etc.

**Justification for in-kind labor (e.g. hourly rates used for calculations). Describe here or in text.

MATCHING CONTRIBUTIONS

CONTRIBUTOR	IN-KIND SERVICE	IN-KIND CASH	TOTAL	Verified? (Y/N)
Landowner Contribution	$ -	$ 300,995.00	$ 300,995.00	Y
DNRC 223 (to be submitted in July)	$ -	$ 20,000.00	$ 20,000.00	N
FFIP	$ -	$ 50,000.00	$ 50,000.00	N
George Grant TU	$ -	$ 5,000.00	$ 5,000.00	Y
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	